IN THE CLAIMS:

The following claims will replace all prior versions of claims in this application.

1. (Currently Amended) A process for preparing an aligning substrate for liquid crystals, comprising the steps of:

providing an aligning substrate comprising an aligning film; and

bombarding at least a portion of the substrate with a plasma beam from a plasma beam source at an incident angle of greater than 0° to about **[[**80°**]]** 85° thereby inducing a surface anisotropy and producing an ~~aligning~~ alignment direction on the bombarded portion of the aligning substrate, wherein 0° is a position of the beam normal to the substrate, wherein an azimuth angle has a reference axis that is a projection of the plasma beam on the aligning substrate in the first bombarding step and a zenithal angle is an angle between the alignment direction and the aligning substrate, wherein

a) the plasma beam bombarded portion of the aligning substrate imparts to a liquid crystal the alignment direction having an azimuth angle φ of 0° and a zenithal angle θ of 0° to about 40°, wherein the liquid crystal is a thermotropic liquid crystal that is one or more of a nematic liquid crystal having a negative dielectric anisotropy, cholesteric liquid crystal, or smectic liquid crystal, ferroelectric liquid crystal; or lyotropic liquid crystal; or

b) the plasma beam bombarded portion of the aligning substrate imparts to a liquid crystal the alignment direction having an azimuth angle φ of 70° to 110° and a zenithal angle θ of about 0°; or

c) the plasma beam bombardment includes a second bombarding step and after the first bombarding step wherein the substrate or plasma source is rotated so that in the second bombarding step, the direction of plasma irradiation is perpendicular to irradiation of the first bombarding step, wherein the bombarded portion of the alignment substrate imparts to a liquid crystal the alignment direction having an azimuth angle φ of 90° and a zenithal angle θ of 0° to 5°.

2. (Original) The process according to claim 1, wherein the plasma beam source is a closed drift thruster.

3. (Original) The process according to claim 2, wherein current density of the plasma beam is about 0.1 to about 1000 $\mu A/cm^2$, and wherein the ion energy is from about 100 to about 5000 eV.

4. (Canceled)

5. (Previously Presented) The process according to claim 3, wherein said closed drift thruster is an anode layer thruster.

6. (Previously Presented) The process according to claim 3, wherein the aligning film comprises polyvinyl cinnamate, unsaturated polyester, polyimide, poly(meth)acrylate, polyvinyl acetate, glass, quartz, gold, indium tin oxide, silicon, silicon oxide, hydrogenated diamond-like carbon, or hydrogenated amorphous silicon.

7. (Currently Amended The process according to claim 6, wherein in the a) alignment direction the zenithal angle θ is 0.1° to about 10°, and wherein in the b) alignment direction the azimuth angle φ is about 90°. ~~the bombarded portion of the aligning substrate imparts an alignment mode having an azimuth angle φ of about 0° and a zenithal angle θ of 0° to about 40°, or an azimuth angle φ of about 90° and a zenithal angle θ of about 0°, wherein the azimuth angle has a reference axis that is a projection of the plasma beam on the aligning substrate and the zenithal angle is the angle between the alignment direction and the aligning substrate.~~

8. (Original) The process according to claim 6, wherein current density of the plasma beam is about 0.5 to about 30 $\mu A/cm^2$, and wherein the ion energy is from about 200 to about 700 eV.

9. (Currently Amended) The process according to claim 3, wherein the incident angle is about 20° to about **[[**75°**]]** 85°.

10. (Original) The process according to claim 9, wherein the incident angle is about 50° to about 75°.

11. (Original) The process according to claim 2, further including a step of forming a liquid crystal cell comprising the aligning substrate and thermotropic or lyotropic liquid crystals.

12. (Original) The process according to claim 4, further including a step of forming a liquid crystal cell comprising the aligning substrate and thermotropic or lyotropic liquid crystals.

13. (Previously Presented) The process according to claim 2, further including a step of placing a mask onto the substrate prior to said bombarding to prevent the plasma beam from reaching a predetermined portion of the aligning substrate.

14. (Previously Presented) The process according to claim 6, further including a step of placing a mask onto the substrate prior to said bombarding to prevent the plasma beam from reaching a predetermined portion of the aligning substrate.

15. (Original) The process according to claim 2, wherein the plasma beam is in the form of a sheet.

16. (Original) The process according to claim 6, wherein the plasma beam is in the form of a sheet.

17. (Original) The process according to claim 2, further including the step of moving the aligning substrate through a path of the plasma beam.

18. (Original) The process according to claim 4, further including the step of moving the aligning substrate through a path of the plasma beam.

19. (Original) The process according to claim 6, further including the step of moving the aligning substrate through a path of the plasma beam.

20. (Original) The process according to claim 1, wherein the aligning substrate is positioned at a distance of about 5 to about 50 cm from the plasma beam source.

21. (Original) The process according to claim 4, wherein the aligning substrate is positioned at a distance of about 5 to about 50 cm from the plasma beam source.

22. (Original) The process according to claim 6, wherein the aligning substrate is positioned at a distance of about 5 to about 50 cm from the plasma beam source.

23-50 (Canceled)

51. (Currently Amended) A process for preparing an aligning substrate for liquid crystals, comprising the steps of:

providing an aligning substrate comprising an aligning film; and

bombarding at least a portion of the substrate with a plasma beam from a plasma beam source at an incident angle of greater than 0° to about **[[**80°**]]** 85° thereby inducing a surface anisotropy and an alignment ~~to produce an aligning~~ direction on the aligning substrate on the area of the aligning substrate bombarded by the plasma beam, wherein 0° is a position normal to the substrate, wherein current density of the plasma beam is about 0.5 to about 30 $\mu A/cm^2$, wherein the ion energy is from about 200 to about 700 eV, wherein the aligning film comprises polyvinyl cinnamate, unsaturated polyester, polyimide, poly(meth)acrylate, polyvinyl acetate, glass, quartz, gold, indium tin oxide, silicon, silicon oxide, hydrogenated diamond-like carbon, or hydrogenated amorphous silicon, **[[**and**]]** wherein the plasma beam source is a closed drift thruster, wherein an azimuth angle has a reference axis that is a projection of the plasma beam on the aligning substrate in the first bombarding step and a zenithal angle is an angle between the alignment direction and the aligning substrate, wherein

a) the plasma beam bombarded portion of the aligning substrate imparts to a liquid crystal the alignment direction having an azimuth angle φ of 0° and a zenithal angle θ of 0° to about 40°, wherein the liquid crystal is a thermotropic liquid crystal that is one or more of a nematic liquid crystal having a negative dielectric anisotropy, cholesteric liquid crystal, or smectic liquid crystal, ferroelectric liquid crystal; or lyotropic liquid crystal; or

b) the plasma beam bombarded portion of the aligning substrate imparts to a liquid crystal the alignment direction having an azimuth angle φ of 70° to 110° and a zenithal angle θ of about 0°; or

c) the plasma beam bombardment includes a second bombarding step and after the first bombarding step, wherein the substrate or plasma source is rotated so that in the second bombarding step, the direction of plasma irradiation is perpendicular to the irradiation of the first bombarding step, wherein the bombarded portion of the alignment substrate imparts to a liquid crystal the alignment direction having an azimuth angle φ of 90° and a zenithal angle θ of 0° to 5°.

52. (Canceled)

53. (Currently Amended) The process according to claim **[[**52**]]** 51, wherein said closed drift thruster is an anode layer thruster.

54. (Currently Amended) The process according to claim 51, wherein in the a) alignment direction the zenithal angle θ is 0.1° to 10°, and wherein in the b) alignment direction the azimuth angle φ is about 90°. ~~the bombarded portion of the aligning substrate imparts an alignment mode having an azimuth angle φ of about 0° and a zenithal angle θ of 0° to about 40°, or an azimuth angle φ of about 90° and a zenithal angle θ of about 0°, wherein the azimuth angle has a reference axis that is a projection of the plasma beam on the aligning substrate and the zenithal angle is the angle between the alignment direction and the aligning substrate.~~

55. (Currently Amended) The process according to claim 51, wherein the incident angle is about 20° to about **[[**75°**]]** 85°.

56. (Previously Presented) The process according to claim 55, wherein the incident angle is about 50° to about 75°.

57. (Previously Presented) The process according to claim 51, further including a step of forming a liquid crystal cell comprising the aligning substrate and thermotropic or lyotripic liquid crystals.

58. (Previously Presented) The process according to claim 51, further including a step of placing a mask onto the substrate prior to said bombarding to prevent the plasma beam from reaching a predetermined portion of the aligning substrate.

59. (Previously Presented) The process according to claim 51, wherein the plasma beam is in the form of a sheet.

60. (Previously Presented) The process according to claim 51, further including the step of moving the aligning substrate through a path of the plasma beam.

61. (Previously Presented) The process according to claim 51, wherein the aligning substrate is positioned at a distance of about 5 to about 50 cm from the plasma beam source.

62. (New) The process according to claim 1, wherein the plasma beam bombarding provides the alignment direction a).

63. (New) The process according to claim 1, wherein the plasma beam bombarding provides the alignment direction b), and wherein the liquid crystals are thermotropic or lyotropic liquid crystals.

64. (New) The process according to claim 1, wherein the plasma beam bombarding provides the alignment direction c), and wherein the liquid crystals are thermotropic or lyotropic liquid crystals.

65. (New) The process according to claim 51, wherein the plasma beam bombarding provides the alignment direction a).

66. (New) The process according to claim 51, wherein the plasma beam bombarding provides the alignment direction b), and wherein the liquid crystals are thermotropic or lyotropic liquid crystals.

67. (New) The process according to claim 51, wherein the plasma beam bombarding provides the alignment direction c), and wherein the liquid crystals are thermotropic or lyotropic liquid crystals.